REMARKS

Applicant's Disclosure Concerning Toxicity and Method of Use

As set forth on pages one and two of the application, the invention provides an insect control that unlike traditional insect controls is not

"toxic, harmful to the environment or accumulates in the body tissue of animals, including humans especially those that are near the top of the food chain"

as well as an agent that is

"a safe, non-toxic insect control composition that is highly effective yet safe for the environment and especially for humans, including children---".

The specification also provides that the product

"is water-soluble, non-toxic, environmentally safe and is a free-rinsing composition, ---.

The specification further provides for biomedical safety (page 6 line 7).

The application also states that in one method of use, the invention provides

"a control 16 including a means for detecting the presence of the pest in the area. The preferred control 16 includes a detector comprising a slot detector circuit coupled to a microphone 18 for detecting the sounds produced by the insect pest."

Amendments to Claims

The claims have now been amended to provide the step of "maintaining the solution devoid of an insecticide, a surfactant or other substance that is harmful to the environment or is toxic to non-insect species including higher animals and humans." Specific surfactants that the applicant discovered are effective have been enumerated.

Claim 26 also includes the limitation "consisting essentially of." In the terms of the application as filed, this expression clearly excludes insecticides that are toxic or poisonous preparations, *e.g.*, those that are sold commercially in spray cans for killing insects such as those listed in lines 1-16, page 10 of the amendment dated June 25, 2002. The applicant also emphatically maintains that the general public has no problem whatsoever understanding what is hazardous, toxic or non-toxic. This fact is manifestly demonstrated by labels of household spray can products that are intended for use by the general public including the commonly known product, Raid®, for example, which has a label stating "hazards to humans and domestic animals, caution" and "hazard to humans, keep out of reach of children". It is therefore respectfully submitted that in light of the present applicant's disclosure of what is meant by safe and toxic and the general knowledge of the public as shown by contemporary labels, one would know what is meant by "toxic to non-insect species including higher animals and humans" or "harmful to the environment," all as clearly disclosed in the present application as filed. Thus, while the Examiner recognizes that the "non-toxic" and "safe" terminology is intended not to apply to the insect pest, the claims as amended are now believed to make it completely clear that the terminology applies to higher animals and humans.

As the Examiner is aware, an applicant is entitled to be his own lexicographer. Accordingly, in the light of the specification, the term "consisting essentially of" can, if the applicant indicates as is the case here, entirely exclude an element rather than "only slightly" indicating exclusion as the Examiner has maintained. Favorable consideration is requested. While the Examiner has said that the term "consisting of" would still permit toxic surfactants inclusive of such agents as sodium lauryl sulfate or kerosene, the amendment to claim 26 now clearly excludes materials that are toxic to higher animals and humans such as toxic surfactants

and toxic propellants. The claims are now believed to be clear, concise, definite and unambiguous and therefore fully in compliance with 35 U.S.C. 112. For these reason, it is respectfully requested that the amendments to claim 26 are clear, definite, unambiguous, supported by the application as filed and patentably distinguishes the present invention from the prior art. Favorable consideration and entry of the amendments without objection is therefore believed to be in order and is respectfully requested.

The References

The Morita patent 5,110,594 describes and insecticide and bactericide made of extracted sell flower essential oil. While the Examiner points out that the leaves of the sell flower have been used to wrap rice cakes and that the fibers are used as a raw material in Japanese paper, it is the sell flower oil itself which is extracted by steam distillation and then dissolved in ether (column 3 line 24) that is then placed in a substrate such as paper. As the Examiner is aware, when the ether evaporates, the concentration of the essential oil approaches 100% as a percentage of the liquid present; the rest is paper fibers. Clearly, the Morita patent is dealing with very high liquid concentrations of the volatile sell oil extract. Therefore, the safety of the sell plant leaves for wrapping rice cakes, (which would have a much lower concentration) or the fibers as a component of paper does not in any way negate toxicity of the extracted oil when dissolved in an ether solution and allowed to become concentrated by the evaporation of the ether. Similarly, the oils from other well-known flowering plants are toxic. For example, the volatile oil extracted from the chrysanthemum flower is toxic to people although, as the Examiner well knows, the flower itself is safely displayed in homes and at flower shows, while the volatile pyrethroidal oil extract, sometimes known as pyrethrum, is a toxic compound. The

same is true of the sell flower. Once the volatile oils are extracted and allowed to become concentrated by solvent evaporation, the toxic insecticidal qualities of the concentrated essential oil then becomes a toxic insect killing agent.

In example 5, the essential sell flower oil is dispersed in water, which is then sprayed for use. However, there is nothing whatsoever to indicate that any component other than the toxic essential sell flower oil acting as an insecticide causes the insect pest to die. Clearly the essential oil functions as a toxic insecticide (see abstract line 5 and 6, lines 5-7 column 1 36-37, lines 48 and 50, column 2 line 41, *etc.*) and even though the essential oil is diluted to 1% or less, when applied to paper the ether evaporates so that liquid phase present is essentially 100% essential oil. Claim 26 provides that the solution:

- reduces the surface tension at the outer layer of the insect's chitinous exoskeleton such that the solution coats out onto the insect blocking sphericals through which the insect breathes sufficient to interfere with respiration.
- The insect is killed solely by means other than the use of insecticide or other toxic substance.

Thus in accordance with the method developed by the applicant, it is the enveloping film of the solution surrounding the insect which is capable of interfering with physiological processes necessary for life that is the sole means of killing the insect. Clearly there is nothing whatsoever in the Morita reference to suggest this method.

The Examiner has suggested that limonene, terpinenes and terpens linalool and nerylacetate can act as surfactants. As seen in the patentee's table, all of these substances are present in amounts less than 6% of the essential oil. Additionally, the applicant has obtained a description of d-limonene and several terpenes. (See attached reference, What is D-Limonene?

Page 1 paragraph 3, lines 1-4.) (See also the attached document entitled "Terpenes" (Bookham Technology) which describes several terpenes that the Examiner will note from the chemical structure have low solubility in water as exemplified by menthol and taxol since one of the major problems with taxol is its low solubility in water (see page 3 last line and page 4 line 1)). None of these compounds are described as surfactants although they may act as a straight solvent for organic materials (page 1 paragraph 3 lines 1-3) and serve as a replacement for mineral spirits, methyl ethyl ketone acetone, *etc.* However, as with most organic solvents, d-limonene is not water-soluble and can even be used in typical water separation units. Consequently there is nothing to indicate that terpenes be present in the essential oil of sell flower act as a surfactant. Accordingly, it is respectfully submitted that the Morita reference neither shows nor suggests the presence of a surfactant sufficient to interfere with respiration so as to thereby kill the insect as claimed. The claims as now amended are therefore believed to be patentably distinct from Morita. Favorable consideration is requested.

Concerning Dohara, *et. al.,* the Examiner states that the invention avoids corrosion of insecticide aerosols column 1 line 4+. However, column 1 line 36+ provides that the base liquid for aerosol contains as an insecticidally active ingredient, at least one pyrethroidal compound. As the Examiner knows, pyrethroidal compounds are toxic. The present claims are distinguished by being devoid of toxic insecticides. The examples 7, 10 and 15 referred to by the Examiner all contain the toxic pyrethroidal compounds.

Nelson depends for its killing effect on the insecticidal properties of certain petroleum fractions (column 1 line 36). The petroleum fractions disclosed are recognized by the patentee as "toxicants" and insecticides (column 1 lines 61 and 62) and excellent killers or "toxicants" (line

66). Although the reference discloses application by spraying, the death of the insect is clearly disclosed to be due to the toxic insecticidal activity of the petroleum fractions.

The Examiner has referred to formula W for the claimed aromatic carrier and surfactant. Although the formula contains an emulsifying agent, nowhere does the patent disclose killing the insects by means other than the toxicity of an insecticide or other toxic substance. To the contrary, formula W contains 25% DDT and 70% of the lethal aromatic fraction AA. The Examiner has referred to formula Z column 8, which produces an emulsion. When an emulsion is formed, there is nothing to indicate that the emulsion is any "thicker," *i.e.*, has a higher viscosity than the base oil, DDT and AA fraction. As the Examiner knows, surfactants are commonly used to maintain stable emulsions. The emulsion may or may not be thicker than the composition without the surfactant. In any case, there is no suggestion to kill the insects solely by means other than toxic insecticides or other toxic substance as claimed. Accordingly, all claims are believed to be patentably distinct from Nelson. Claims 29 and 30 are believed to be patentably distinct because of the thickener.

Claims 26, 27, 31, 32 and 34 were rejected as anticipated by Neal. The pesticidal activity disclosed in the Neal reference is based upon the solanaceous genus *Nicktiana* which contains many other poisonous plants such as nightshade and jimsonweed. In fact, the *Nicktiana* genus has been used as a source of alkaloids for controlling insects since 1746 (column 1 line 2) and the substances disclosed depend for pesticidal activity upon its high biological activity (page 2 column 1 line 18 from the bottom of the page). Although some "safer soap" products were used for comparative purposes and are not part of the invention disclosure, its composition is not given. Consequently, the Neal reference does not disclose a surfactant composition devoid of biologically active toxic insecticide. Claims 26, 27, 31, 32 and 34 are therefore believed to be

patentably distinct from Neal. Favorable consideration is believed to be in order and is respectfully requested.

Although the Examiner points out that on page 1603 the action of M-pede/Safer Insecticidal Soap is not understood, it is speculated that the material disrupts the integrity of cellular membranes and uncouples oxidative phosphorylation. By contrast, the effectiveness of the present invention is based upon an entirely different mechanism, namely,

"--- the solution coats out onto the insect blocking spiracles through which the insect breathes sufficient to interfere with respiration thereby killing the insect solely by means other than toxicity of such an insecticide or other substance."

Claim 34 as amended also calls for "control apparatus" and for spraying responsive to the presence detected by said apparatus. This is entirely different from mere "sensing." No reference appears to provide or suggest providing a control apparatus and for spraying surfactant (which unlike Raid®, *etc.* and other toxic insecticides can be safely sprayed) responsive to presence detected by a control apparatus (see the Figure). Claim 34 should therefore be allowed for this additional reason. Applicant has thus discovered here a method of spraying that can for the first time be safely done "automatically" yet without risk to humans or the environment and is not suggested by any combination of references. Claim 34 should therefore be allowable.

Claims have been rejected as unpatentable under 35 U.S.C. 102 in view of Horst. The Horst reference discloses a method of killing insects using a surfactant comprising between 0.10% and 10% of an alkali metal or ammonium salt of C_6 to C_{14} dialkyl sulfosuccinate. The claims as amended call for a surfactants selected from nonionic surfactants ethoxylated nonylphenol, amphoteric surfactants and cationic surfactants. The Horst disclosure suggests that only certain sulfosuccinate anionic surfactants are operable. A review of Horst makes no

suggestion that the claimed compounds would be likely to produce successful results. Horst discloses the use of an anionic organic surfactant ion. In a preferred form of the present invention described on applicant's page 6 beginning on line 7, metal ions are employed to enhance performance. These added metal ions in contrast to Horst are non-reactive with applicant's organic portion of the claimed surfactants. Thus when used, they are more available in applicant's invention than in Horst, rendering applicant's claimed surfactants surprisingly more effective in killing or debilitating insects than anything suggested by Horst. See *in re Deuel,* 34 USPQ 2d 1210, 1214 (Fed.Cir. 1995) holding:

> "Because Deuel claims new chemical entities in structural terms, a prima facie case of unpatentability requires that the teachings of the prior art suggest the claimed compound to a person of ordinary skill in the art. Normally a prima facie case of obviousness is based upon structural similarity, *i.e.* an established structural relationship between a prior art compound and the claimed compound. Structural relationships may provided the requisite motivation or suggestion to modify known compounds to obtain new compounds... In all of these cases, however, the prior art teaches a specific, structurally-definable compound and the question becomes whether the prior art would have suggested making the specific molecular modifications necessary to achieve the claimed invention."

See also *in re Deuel in re* Baird 16F. 3d 380, 29 USPQ 2d 1550 (Fed.Cir. 1994) holding,

> that a broad genus does not necessarily render obvious each compound within its scope.

Horst makes no suggestion that the claimed compounds can achieve the results indicated. The unexpected success of the claimed compounds in debilitating or killing the insects is surprising

and thus patentably distinct from the Horst disclosure. The amended claims are therefore believed to be fully allowable over the Horst disclosure. Favorable consideration and allowance of claims over the Horst reference as well as the other references is believed to be in order and is therefore respectfully requested.

Respectfully submitted,

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